

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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#13 12/10

Inter Patent Application of

FISHER et al

Atty. Ref.: **540-231**

Serial No. **09/623,681**

Group: **3726**

Filed: **September 7, 2000**

Examiner: **David Bryant**

For: **MANUFACTURING AND ASSEMBLY OF
STRUCTURES**

APPEAL BRIEF

On Appeal From Group Art Unit 3726

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TECHNOLOGY CENTER #3700

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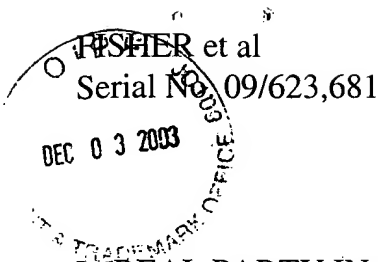


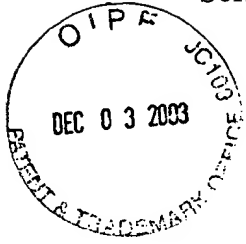
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I. REAL PARTY IN INTEREST

The real parties in interest in the above-identified appeal are BAE SYSTEMS plc and Advanced Composites Group Ltd by virtue of the Assignment from the inventors to BAE SYSTEMS plc and Advanced Composites Group Ltd recorded September 7, 2000, at Reel 11094, Frame 0796.

II. RELATED APPEALS AND INTERFERENCES

There was a previous appeal in this case in which the Appeal Brief was filed on November 27, 2002 and, after which, the final rejection was withdrawn and a new rejection mailed on February 20, 2003 based upon essentially the same grounds.

III. STATUS OF CLAIMS

Claims 1-6 and 8-12 stand rejected in the outstanding Final Rejection. The Examiner contends claims 1-6 and 8-12 are either anticipated or obvious in view of the cited prior art.

IV. STATUS OF AMENDMENTS

No further response has been submitted with respect to the third Official Action in this application.

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V. SUMMARY OF THE INVENTION

The present invention relates to a method of assembling a structure wherein a precise interrelationship between elements of the structure is required.

Known prior art methods of assembly involve coating a sub-structure with a liquid adhesive material which is then cured on the sub-structure and then machined. The outer layer is then assembled to the sub-structure. This conventional method has a number of disadvantages. First, the adhesive is a viscous liquid which must be applied by hand requiring highly trained individuals so as to be evenly distributed with the desired thickness and without air bubbles.

Special tooling must be manufactured for each area to be paneled to prevent the liquid adhesive from spreading to undesirable areas. This tooling must be coated with a release agent to prevent adhesion to the sub-structure and then requires substantial cleaning afterwards. This repeated exposure of the tooling to the coating and cleaning process causes it to deteriorate rapidly after a low number of uses, thereby requiring time and expense to replace the tooling. Additionally, the hand assembled manner of the process requires substantial expertise, training and individual application.

Appellants have found a method of structure assembly which avoids the disadvantages of the above-discussed method. Appellants found that positioning a shim material which is comprised of either a film or sheet of preformed shim

material on the sub-structure can be easily accomplished without special tooling or training. The shim material is then cured in place on the sub-structure before any outer layer assembly. The third step is that the cured shim material is machined to the desired thickness and only then is the fourth step of assembling the outer layer on the sub-structure accomplished.

Thus, the present invention is characterized by a sequence of four steps, i.e.,

(1) **"positioning the shim material on at least part of the sub-structure, said shim material comprising one of a film and sheet of preformed shim material"** to the sub-structure, (2) **"curing the shim material"**, (3) **"machining the cured shim material"** and only then (4) **"assembling an outer layer with the sub-structure."**

VI. ISSUES

Whether claims 1-6 and 8-12 are obvious over Applicant's Admitted Prior Art (AAPA) in view of Thomas (U.S. Patent 3,609,116).

VII. GROUPING OF CLAIMS

The rejected claims stand or fall together based upon the patentability of independent claim 1.

VIII. ARGUMENT

1. Discussion of the References

Applicant's Admitted Prior Art (AAPA) as discussed in the official action is comprised of pages 1 & 2 of the specification as originally filed. As discussed in the Summary of the Invention portion of this Appeal Brief, the prior art method described involves coating the structure (to be shimmed) with a liquid adhesive material, curing that liquid and then machining the cured liquid to the desired shim thickness. The noted problems with such AAPA is the requirement that it be applied by hand with some degree of skill so as to create an even coating thereby facilitating concurrent curing of different portions. Also, it is necessary to avoid air bubbles, runs, and coating other portions of structures. Additionally, special tooling is needed for the skillful application of the liquid material which tooling must be coated with a release material to prevent the liquid shim material from coating and ruining the tooling. This then requires cleaning and as a consequence, relatively rapid replacement of the tooling.

Thomas (U.S. Patent 3,609,116) teaches a moldable shim material, similar to a caulking compound which can be injected into structural gaps or applied prior to the mating of parts. It also may be pressed or calendered into strips and applied in strip form prior to mating of the parts. The material is considered a structural

member after curing and may be machined, drilled or riveted. These are characteristics of the material and not the method of use of the material.

The method of use disclosed in Thomas is that of a conventional shim material, i.e. injecting or placing the shim material in the uncured state between the parts being fitted together, fitting them together and then curing the shim material in place. In other words the method is "positioning", "curing", "assembling" and, if needed, "machining." There appears to be no disclosure in any part of the Thomas reference of positioning the shim material on a structure, curing the shim material and then machining the cured shim material, all prior to assembling an outer layer on the sub-structure.

2. Discussion of the Rejections

Claims 1-6 and 8-12 stand rejected under 35 USC §103 as being obvious over AAPA in view of Thomas. With respect to claim 1, the Examiner contends that the sequence of appellants' claimed steps is taught by the Thomas reference. While appellants believe that some of the steps are taught in the Thomas reference but the claimed sequence of steps is not.

not true.
the predom
shim material
is taught by
Thomas.
AAPA teaches
sequence

3. The Errors in the Final Rejection

There are at least three significant errors in the Final Rejection and they are summarized as follows:

- (a) Thomas teaches away from curing and machining steps prior to assembly;
- (b) AAPA doesn't teach film or sheet of shim material; and
- (c) No suggestion to combine Thomas and AAPA.

(a) **Thomas teaches away from curing and machining steps prior to assembly step**

Thomas teaches the conventional use of shim material, "its salient use being as a cast-in-place moldable shim material." Col. 8, ln 4-5. This material is placed upon one structure, the other structure placed on top and the excess material is extruded out of the edges of contact of the two structures. The material is then cured in place and the excess material machined away. Because of this assembly before any machining step (assuming for the purpose of argument that machining away the cured excess adhesive is a "machining" step), Thomas actually teaches the sequence of positioning, assembly (before curing and machining), then curing and then machining steps. Quite clearly, Thomas teaches and suggests a sequence of method steps substantially different from claim 1 and therefore "teaches away" from appellants' invention.

analysis cannot
be
confirmed

a teaching
method based
on common
thought

Appellants' invention specifically recites the steps of (1) positioning the shim material, (2) curing the shim material, (3) machining the shim material, and only then is appellants' last claimed step performed, i.e., (4) assembling an outer layer with the machined shim material substantially between the outer layer and the sub-structure. It is noted that the Examiner's detailed analysis of the Thomas reference omits any disclosure of the sequence of steps recited in appellants' claim.

Thomas
sequence not
critical

The Examiner's admission that the AAPA fails to disclose "the limitation 'said shim material comprising one of a film and sheet of preformed shim material.'" The Examiner then speculates that it would be somehow obvious to take the shim material from Thomas and substitute it for that in the AAPA. Such speculation is not permitted and indeed 35 USC §103 requires that there be some specific disclosure in at least one prior art reference in order to support a rejection under §103. There has been no such suggestion.

EXPLICIT
suggestion about
shim can be
strips rather
than liquid

Thomas clearly fails to support the sequence of steps, i.e. positioning, curing and machining, all occurring prior to the final step of "assembling." Thomas by itself or in combination with the AAPA does not disclose appellants' claimed invention.

(b) AAPA doesn't teach film or sheet of shim material

re comment
necessary:
I agree

In addition to the Examiner's admission that AAPA doesn't teach shim material of a film or sheet, appellants' AAPA teaches a liquid adhesive which can

be cured and then machined to a desired thickness. However, the disadvantages of such liquid adhesives is also well documented in the specification as being a problem with the AAPA, i.e. must be carefully hand applied, health and safety implications associated with use, requires highly trained personnel, requires special tooling to prevent contamination of other areas, requires tooling to be coated with release agent and thoroughly cleaned after use, etc.

Appellants have come up with a solution to the above problems in an inventive process which utilizes the best features of both the Thomas and the AAPA. Appellants' method uses the film or sheet of shim material, but in a manner contrary to that disclosed in the Thomas reference. The material is placed on the sub-structure and cured in place. It is then machined and only after that machining step is the outer layer assembled onto the sub-structure.

Thus, the problems associated with the AAPA and its use of a liquid adhesive are overcome, no special tooling is required, nor the highly skilled and labor intensive steps of applying the adhesive. As a result, the present invention is a substantial improvement over the AAPA and utilizes a sequence of steps which is the direct opposite of that suggested and taught in the Thomas reference. Accordingly, the AAPA does not teach appellants' claimed invention and thus it cannot anticipate or render obvious appellants' claims.

(c) No suggestion to combine Thomas and AAPA

The Examiner previously admitted that various features of appellants' claims 3, 4, 5 and 6 are not shown or disclosed in the Thomas reference. However, the Examiner suggests that these features are obvious in some fashion (not otherwise disclosed with reference to claims 3 and 4) or obvious in view of AAPA (with reference to claims 5 and 6). If the method steps of claims 3 and 4 are not shown or disclosed in Thomas as admitted by the Examiner, they cannot be obvious in view of the absence of any other cited reference. Therefore, the rejection of claims 3 and 4 is respectfully traversed.

makes no sense - using logic vs. rejection

Even if the AAPA taught the missing step of claims 5 and 6, the burden is on the Examiner to establish how or why it would be obvious to combine the Thomas and AAPA. As noted above, Thomas clearly "teaches away" from the sequence of steps set out in appellants' independent claim 1 and all other claims are dependent from claim 1.

The burden is on the Examiner to establish how or why one of ordinary skill in the art would be motivated to disregard the teachings of Thomas, leading one of ordinary skill in the art away from appellants' claimed combination of steps, and, instead, combine the features of "strips and applied in strip form" from Thomas to the AAPA teaching. The burden is on the Examiner to establish some motivation

Thomas teaches 1) and the opposite, then says another option? about more motivation needed?

for such combination and for such picking and choosing of structures or method steps from the prior art. These burdens have not been met by the Examiner.

The Court of Appeals for the Federal Circuit has consistently held, for example, *In re Rouffet*, 47 USPQ2d 1453, 1457-8 (Fed. Cir. 1998) that

"to prevent the use of hindsight based on the invention to defeat patentability of the invention, this court **requires** the examiner to show a motivation to combine the references that create the case of obviousness. In other words, **the Examiner must show reasons** that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed." (emphasis added).

In this regard, the Examiner has provided no motivation for combining the Thomas reference with the AAPA, nor has he indicated how or why one of ordinary skill in the art would disregard the teachings in the Thomas reference to position the shim material, assemble the outer layer and then cure and machine the shim material, rather than appellants' claimed combination which is to position shim material, cure the shim material, machine the shim material and only then assemble the outer layer.

Inasmuch as the burden is on the Examiner, he has failed to meet the burden of establishing a *prima facie* case of obviousness with respect to claims 3, 4, 5 and 6, and therefore any further rejection under is respectfully traversed.

IX. CONCLUSION

Appellants' claim recites a sequence of (1) positioning shim material, (2) curing shim material, (3) machining shim material and (4) assembling the structure. The Thomas reference teaches step (1) positioning shim material, then step (4) assembling the outer layer, then step (2) curing the shim material and finally, step (3) machining the shim material. The Thomas sequence (1, 4, 2 & 3) clearly "teaches away" from appellants' claimed sequence of steps (1, 2, 3 & 4). The AAPA teaches the use of a liquid adhesive and the well-known problems associated with such use. The Examiner's failure to provide any reason for disregarding the Thomas teaching when combining with AAPA obviates the basis for rejection. The failure to meet the Patent Office's burden of establishing a *prima facie* case of anticipation and/or obviousness renders improper the currently pending rejections.

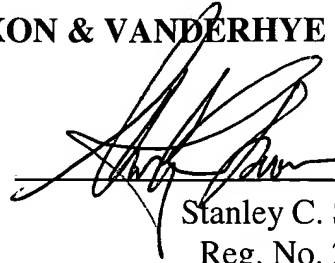
Thus, and in view of the above, the rejection of claims 1-6 and 8-12 over the cited prior art is clearly in error and reversal thereof by this Honorable Board is respectfully requested.

FISHER et al
Serial No. 09/623,681

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: _____



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SCS:kmm
Enclosures
Appendix A – Claims on Appeal



APPENDIX A

Claims on Appeal

1. (*Amended*) A method of assembling a structure comprising at least the steps of:

 providing a sub-structure,

 positioning shim material on at least part of the sub-structure, said shim material comprising one of a film and sheet of preformed shim material,

 curing the shim material disposed on the sub-structure,

 machining the cured shim material to a desired thickness, and

 assembling an outer layer with the sub-structure such that the machined shim material lies substantially between the outer layer and the sub-structure.
2. A method as claimed in claim 1 wherein the shim material is cured at below 80°C.
3. A method as claimed in claim 1 wherein the curing is effected by exposure of the shim material to ultra violet light.
4. A method as claimed in claim 1 wherein the curing is effected by exposure of the shim material to radio frequency radiation.

5. A method as claimed in claim 1 wherein the outer layer comprises at least two parts and the thickness of each outer layer part is measured prior to machining the shim material.

6. A method as claimed in claim 5 wherein the shim material is machined to different thicknesses at different locations on the sub-structure so that, when assembled to the sub-structure, the outer layer parts together conform, within pre-determined tolerances, to a pre-determined profile.

8. A method as claimed in claim 1 wherein the film or sheet of shim material is pre-cut into a shape suitable for direct use in a particular application prior to the shim material being positioned on the sub-structure.

9. A method as claimed in claim 1 wherein the film or sheet of shim material has a thickness in the range 0.4 to 4.0 mm.

10. A method as claimed in claim 1 wherein the shim material is positioned on a vertical surface of the sub-structure.

11. A method as claimed in claim 1 wherein the shim material is positioned on the underside of the sub-structure.

12. A method as claimed in claim 1 wherein the shim material substantially does not flow during curing at temperatures of up to 80°C.